Parthenogenic Reproduction in the Silverfish *Nicoletia meinerti* (Thysanura)

Veronica Dougherty Picchi
Department of Entomology, the American Museum of Natural History
New York, New York 10024

Received for Publication October 6, 1971

Abstract: Two successive generations of *Nicoletia meinerti* Silvestri raised in individual isolation demonstrated that this species could reproduce parthenogenetically. The eggs are described and illustrated and several biological observations are recorded.

Nicoletia meinerti Silvestri is widely distributed in greenhouses of Europe, northern South America, western Africa and Hawaii. Because of the scarcity of males (Wygodzinsky, verbal communication) it is believed that it reproduces parthenogenetically.

To demonstrate parthenogenesis in *N. meinerti* I isolated 26 female adults from a terrarium population which had originated with six female specimens from Pará, Brazil. The adults were placed in glass-covered rearing dishes lined on the bottoms with a mixture of crushed bone carbon and Plaster of Paris. This facilitated locating the pale gray *Nicoletia* eggs and the newly hatched, translucent white offspring. Humidity was the most important factor in rearing these animals. They were watered and fed lettuce two or three times a week and kept at a room temperature of 65°–75° F. in an area of light shade. Every other week methyl p-hydroxy benzoate ("Nipagin") was added to the water as a fungicide.

Each of the 26 females laid one or two eggs per month. Fifty-five eggs were obtained of which 74 per cent hatched in 46 to 59 days. When they were about three days old the young were placed in individual containers. These young, all females, were the first laboratory isolated generation. They matured to egg-laying age in an average of 137 days and all laid eggs. The eggs of two individuals did not hatch. Sixty per cent of the first laboratory generation eggs hatched, in an average of 44 days and were the first parthenogenetic generation. Isolated members of the second laboratory generation, again all females, also laid viable parthenogenetic eggs which hatched. Throughout the entire observa-

Acknowledgments: The Stereoscan Electron Microscope photographs in this paper were provided by Drs. Vincent Pallidino and John Duffy, and taken by Mr. Fred Miller of the Meadowbrook Hospital. I would like to thank Dr. Lee H. Herman, Jr. for his help and advice in obtaining these photographs.

I would like to thank Dr. Pedro Wygodzinsky for his help, encouragement, and patience through the production of this little paper.

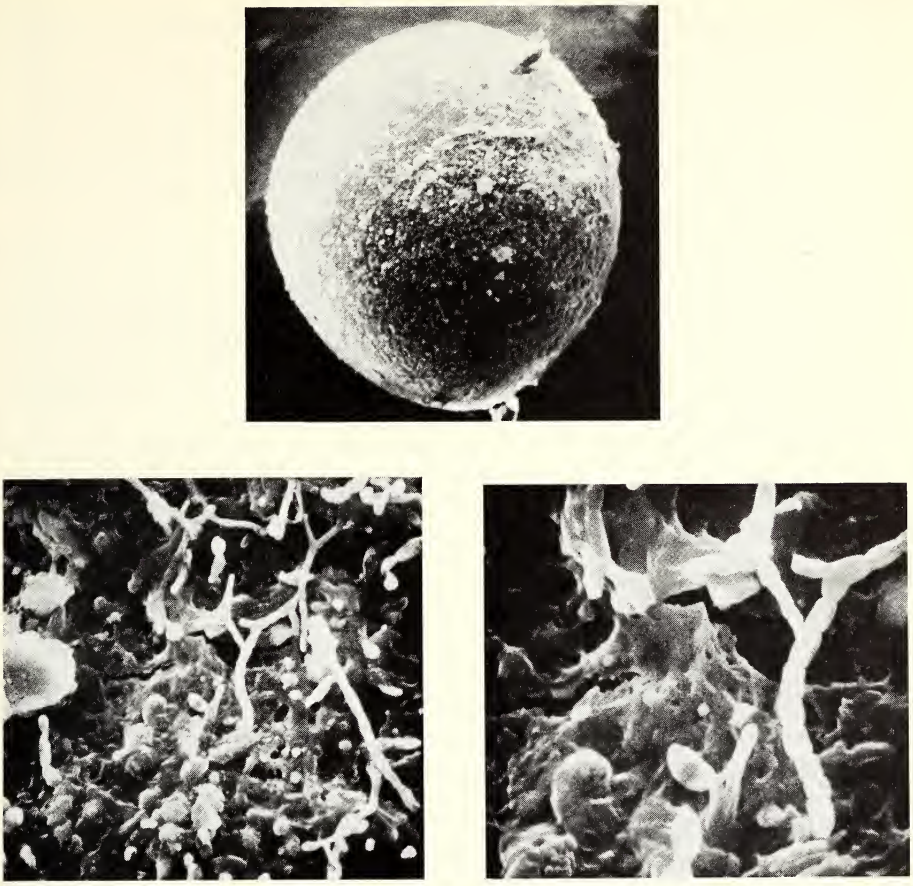

Fig. 1. Egg of *Nicoletia meinerti* Silvestri, above: general appearance at magnification of 120 times; lower left: egg at 2,400 magnification; lower right: 6,000 magnification.

tion period no male *N. meinerti* were seen, hence two generations were reared on the parthenogenetic ability of the female *N. meinerti.*

Nicoletia meinerti eggs varied in color from pale to dark gray and were more or less polar, having definite ends on the longer axis giving them a lemon-like shape. The eggs were laid free and unattached to the substrate. This is significant as the closest known relatives of the Nicoletidae, the Lepismatidae, are known to lay eggs which are attached to the surrounding substrate. *N. meinerti* eggs averaged 0.75 mm. × 0.68 mm. Electron scanning scope pictures of *Nicoletia* eggs show the nature of the egg surface (Fig. 1). The eggs photographed were viable and relatively unclean and show debris and fungal hyphae on the chorion. The eggs are irregularly pitted and have rounded cresting surfaces when seen at 6,000 × magnification.

Several interesting behavior patterns were noted. These insects always avoided contact with drops of water but often congregated around substrate that had just absorbed water. They were cannibalistic, especially when an injured individual was left in a community container. If the injured insect responded to another with normal antennal and cerci movements it was left alone. The adults seemed to eat some of the eggs. Several times adults were observed carrying eggs and later I counted fewer eggs.

Individual adult animals spent much of their time running along the bottom inner walls of their circular containers. When the covers were removed only a few would climb to the top of the quarter inch high container walls and still fewer completely left the containers. The very young were most often found under lettuce covering and rarely in the mainstream of adult traffic along the container walls. These behavior patterns may indicate a tendency of these silverfish to keep as much contact with the substrate as possible.

Nicoletia meinerti moults periodically throughout its entire life, but rarely could I find signs of a shed skin; therefore, I assume the skins are eaten.

I kept several of the original terrarium generation adults under observation for over a year, after which they appeared darker, larger and seemingly thicker than the average terrarium adult. These larger animals measured an average length of 7.2 mm from antennal base to the base of the cerci.

Nicoletia meinerti is an interesting experimental animal. It is easily reared in the laboratory but little is known about its behavior and biology. Because of its parthenogenetic nature its chromosome behavior should be studied as various types of polyploidy have been found in other insect groups where parthenogenesis occurs. In view of its scattered geographic distribution it would be interesting to know if this parthenogenesis occurs only in individual populations or throughout the species.